Aerospace Propulsion Laboratory

항공우주추진연구실

ENERGY AEROSPACE DEFENSE SAFETY HPC

Principal Investigator

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2009 Ph.D. in Aerospace Engineering, Seoul National University, Korea
1999 M.S. in Aerospace Engineering, Seoul National University, Korea
1997 B.S. in Aerospace Engineering, Seoul National University, Korea

2019-present Assistant Professor, Department of Aerospace Engineering, SNU
2016-2019 Assistant Professor, School of Mechanical Engineering, GIST
2013-2016 Research Scientist, King Abdullah University of Science and Technology, SA
2011-2012 Research Associate, University of Cambridge, Cambridge, UK
2009-2010 Principal Researcher, LIG Nex1, Seoul, Korea
1999-2007 Researcher, Agency for Defense Development, Daejeon, Korea

한국연소학회 이사
한국추진공학회 이사
한국전산유체공학회 이사
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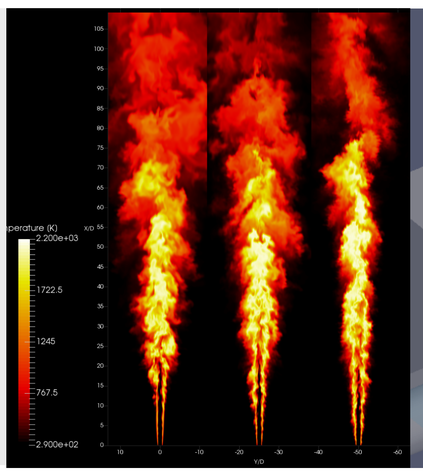
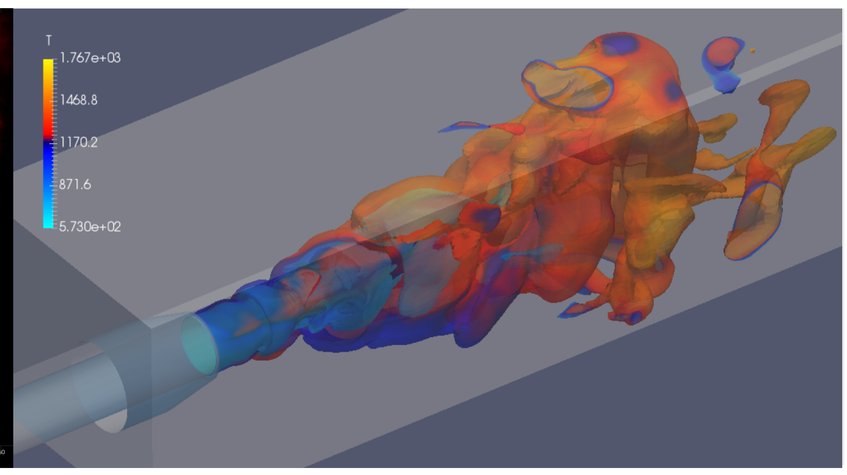
차세대소형위성사업 전담평가위원
HPBench 국제프로그램위원
연구재단 국책연구본부 전문위원

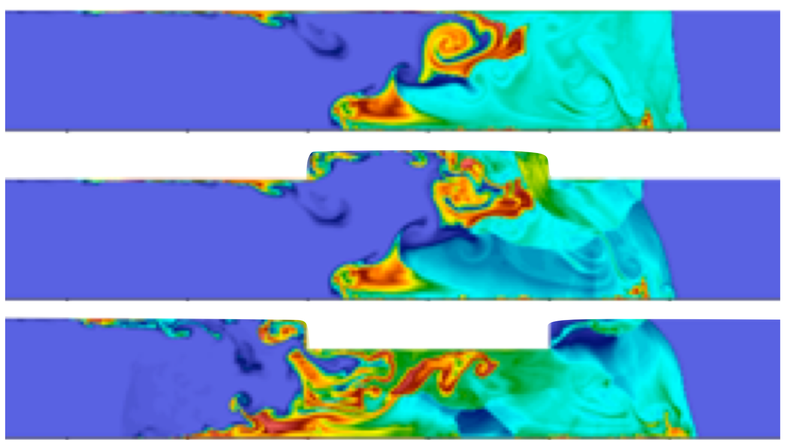
Research Topics

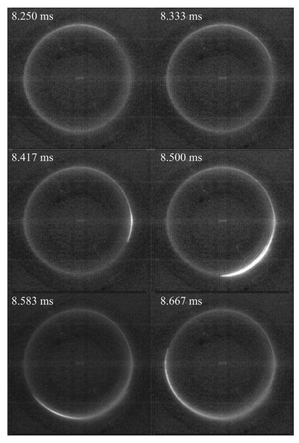
High Fidelity CFD for Combustion Science & Technology

Laminar & Turbulent Flame Dynamics and Stability
DNS (Direct Numerical Simulation) and LES (Large Eddy Simulation)
Combustion at High Pressures and Supercritical Conditions (Real EOS)
Innovative, Clean and Efficient Combustion







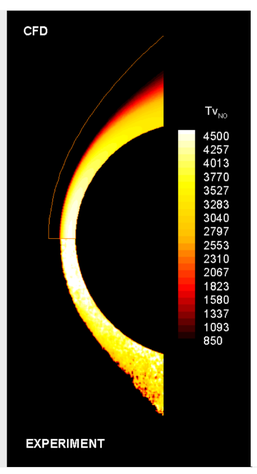


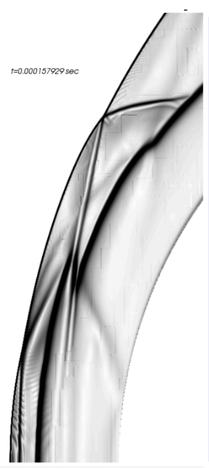
Highly Energetic Systems & Safety

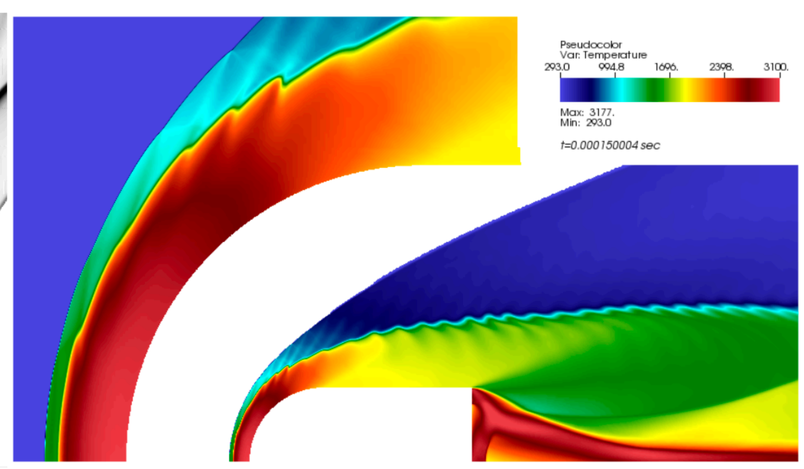
Detonation Wave Dynamics under High Loss Conditions
Numerical Methods for Condensed Phase Detonation
Spontaneous Ignition of Released Hydrogen from Pressurized Storage
Application of Meso-/Micro-Scale Detonation (Needle-Free Injection)

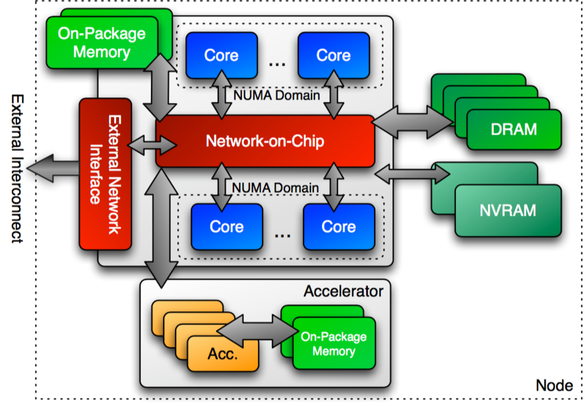
Hypersonics & Propulsion Systems

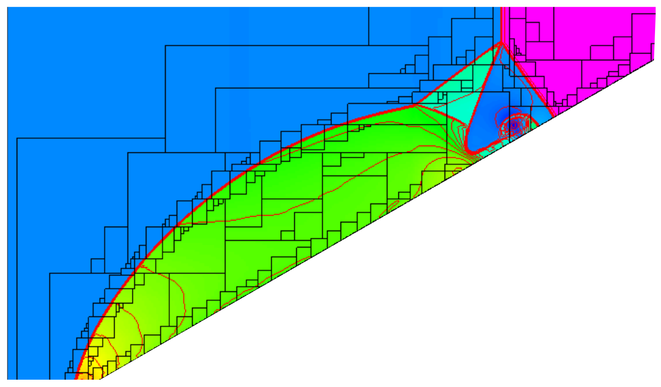
Hypersonic and High-Enthalpy Aerothermodynamics
Robust Riemann Solvers for Strong Shocks and Reactive Systems
Ramjet and SCRamjet Propulsion Systems
Innovative and Hybrid Propulsion Systems











High Performance Computing

Massively Parallel Computing on Supercomputers
Hierarchical and Adaptive Parallelism for Hybrid Computing Architectures
Adaptive Mesh Refinement (AMR) and Embedded Boundary Methods
GPU Accelerations for Combustion Modeling

Ongoing Projects

[중견연구] 기계학습을 이용한 반응유동 수치해석의 상세반응기구 대체 연구
[에너지기술혁신] 발전용 H급 가스터빈 can-type 저선회 버너 원천기술 개발
[미래해양클러스터] 실제유체모델 적용 Liquid Expander 노즐 설계 및 유동해석
[해외/KAUST] 플라즈마 및 연소 통합 해석체계 개발
[한국항공우주연구원] 경계층 제어장치 형상에 따른 극초음속 흡입구 유동 및 성능 예측
[서울대학교] GPU를 활용한 난류연소해석 가속

[2019/2차 R&D혁신지원연구]
직접모사기법을 이용한 데이터 기반 난류-점화에너지 모델구축
[2019/3차 R&D혁신지원연구]
관을 통해 전파하는 예혼합화염의 열음향 불안정 수치적 연구

Collaborators